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ABSTRACT

Three decades of applications of information technology and library automation at Ohio University are chronicled in this paper. The first major development highlighted is the founding of OCLC (the Ohio College Library Center) as a cooperative cataloging device in the 1960s. OCLC's growth is traced from when it was a small organization of two staff members with a $67,000 budget and serving 54 libraries in 1967, to a complex independent organization employing 885 people with a budget of $95.7 million and a growing membership of 9,400 libraries in 1988. Featured accomplishments of the 1970s include OCLC's successful online interlibrary loan system, which has received an estimated 20 million requests from its 1979 inception to 1988. A major development at Ohio University during the 1980s is the ALICE system, an online locally integrated library system which interfaces with OCLC (now the OCLC Online Computer Library Center, Inc.) for online shared cataloging and interlibrary loans. ALICE offers an online public access catalog, acquisitions, circulation, and serials control. Based on the Virginia Tech Library System (VTLS) software, ALICE uses microwave and telephone lines to serve libraries at five regional campuses in a network mode. Other advancements include: (1) the growth of online database searching; (2) expanding nonprint collections that include new formats; and (3) growing use of CD-ROM based information. A new development foreseen for the 1990s is a statewide information system to facilitate library resource sharing. Five diagrams accompany the text. (13 references) (SD)

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Trends in Automation in American Academic Libraries: Ohio University's Experiences[1]

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ABSTRACT

The recent technological advances in computers, telecommunications, optical discs and mass storage, to highlight a few, provide new opportunities for libraries to cope with the explosion in quantities and formats of information as well as the variety of demands from information seekers for easy and prompt access. The Ohio University Library, one of the founding members of OCLC and the first member institution to enter a bibliographic record online into the OCLC database, uses many of these emerging information technologies in its daily work. This paper describes these applications of information technology at Ohio University. The foundation is an online locally integrated library system, ALICE (using Virginia Tech Library System [VTLS] software). ALICE interfaces with OCLC for online shared cataloging and interlibrary loans and offers an online public access catalog, acquisitions, circulation, and serials control. Through microwave and telephone lines, ALICE also serves libraries at five regional campuses in a network mode.

In addition, Ohio University Library offers Computerized Information Retrieval Service (CIRS) to provide online access to over 400 major databases worldwide through DIALOG, BRS, and STN. The use of a telefacsimile machine for electronic delivery of information between libraries is now a common practice. In cooperation with the University's Computing Service, an extensive computer laboratory is provided in the main library facility. Microcomputers are generously provided to library staff in every department to facilitate office automation. Selected CD-ROM based databases of general interest have been purchased and made available to library users. Experience with these technologies provides the basis for great optimism for libraries abilities to respond to the information explosion and to user needs.

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1. INTRODUCTION

Historically American Libraries have been in the forefront in applying information technologies: from the origins of the Hollerith punched-card tabulating system in the latter part of the 19th century; through the growing use of micrographics in the 1930s; photocopying and data processing equipment in the 1950s; the wide-spread application of succeeding generations of computers and the accompanying developments in telecommunications in the 1960s and 1970s; to the mass storage as exemplified in optical discs in the 1980s. The pace of innovation accelerates as each new technology is adopted and refined.[2]

A comprehensive state university of 24,000 students founded in 1804, Ohio University has a main campus in Athens, Ohio, and five regional campuses in surrounding Southeastern Ohio. Just as in many American academic libraries, Ohio University Library has been in the mainstream of information technology applications and library automation. Since the beginning of OCLC under its former name, the Ohio College Library Center, back in 1967, the Ohio University Library has been an active participant and supporter. The case history of Ohio University Library in the applications of information technology and in library automation can be seen as fairly representative of academic libraries in North America. For the past three decades, despite differences in strategy, approach, and timing among academic libraries, the general trend has been comparable to that which I will describe for Ohio University.

2. SIGNIFICANT DEVELOPMENTS IN THE 1960s

In the 1960s, computers (then all mainframes) were too expensive for most libraries, and library applications software was generally unavailable, yet several major initiatives with far-reaching impacts on library automation were launched. These included the MEDLARS (**MED**ical **L**iterature **A**nalysis and **R**etrieval **S**ystem) project of the National Library of Medicine, the INTREX (**IN**formation **TR**ansfer **EX**periment) project by the Massachusetts Institute of Technology, the design and implementation of the MARC (**MA**chine **R**eadable **C**ataloging) format by the Library of Congress, and the establishment of the **O**hio **C**ollege **L**ibrary **C**enter (OCLC) by a group of academic libraries in Ohio, including Ohio University. At about the same time, Stanford University initiated its BALLOTS (**B**ibliographic **A**utomation of **L**arge **L**ibrary **O**perations using a **T**ime-sharing **S**ystem) project which evolved into the Research Libraries Information Network (RLIN). Another important trend in the 1960s was the beginning by many abstracting and indexing services to use computers in photo composition and typesetting of printed publications--making possible machine-searchable databases.

The MEDLARS Project and subsequent medical information network developed by the National Library of Medicine has benefitted immeasurably medical and health sciences libraries and the profes-

sionals whom they serve. The INTREX project, from 1965 to 1973, reaffirmed the design concept that large libraries could become information transfer systems. But, as we assess the importance of the major developments in the 1960s, the most significant and far-reaching were probably the design in 1965 of a MARC format for bibliographic data (which is machine-readable, largely interchangeable, and internationally acceptable) and the establishment in 1967 of OCLC. The beginning distribution on magnetic tapes of MARC-formatted cataloging records by the Library of Congress undoubtedly affected the design of OCLC and its first computer-based shared cataloging and union catalog system. Other than these major applications, library automation in the 1960s tended to replicate manual processes including the use of computers for the production of catalog cards, accession lists, serial holdings, and the like.

3. THE MUSHROOMING OF OCLC IN THE 1970s

The founding of OCLC in 1967 by a small number of academic library members of the Ohio College Association and the Inter-University Library Council--which consisted of library directors of state-supported universities in Ohio, followed sixteen years of study and deliberation and also involved the Ohio Library Association.[3] Only after the successful implementation of the MARC project in November 1966, cooperative, shared cataloging on a centralized computer system became practical.

Through the foresight of the Ohio academic librarians and the effective leadership of Mr. Frederic G. Kilgour, Executive Director of OCLC from its inception in 1967 to his retirement in 1980, OCLC grew by leaps and bounds from a small organization of two staff members, with an initial budget of $67,000 and 54 participating libraries in Ohio to a complex organization of over 885 staff members, with a budget of $95.7 million in 1988 and a growing membership of 9,400 libraries of all types in the U.S. and 26 other countries. [Diagram I]. Initially OCLC provided a computer-based cataloging system in batch process. This was upgraded to a real-time, online, interactive mode in 1971. On August 26, 1971, Ohio University Library entered the first member-produced cataloging record online. Although the system immediately crashed, Ohio University Library ended that day with 147 titles cataloged. During the first two days an average of ten titles per terminal hour were entered.

The instant success of the OCLC shared cataloging system attracted other Ohio libraries and, soon, libraries in other states. Reflecting broader library membership and geographical distribution, OCLC in 1977 changed its name to OCLC, Inc. In 1981, with the adoption of a new governance structure, the legal name became the OCLC Online Computer Library Center, Incorporated.[4]

Most significant in OCLC's growth was the expansion of its cataloging database. From its 1971 beginning, the database reached

its one millionth record in September 1974, a period of over three years. The second million records took 18 months to accumulate. As the number of members increased so did the rate of growth in the records. The most recent million records, to 19 million, in January, 1989 took only six months! This has made OCLC the largest and fastest growing bibliographic database in the world. [Diagram II]. According to OCLC, of the 19 million bibliographic records, 80 percent were contributed by OCLC members. The remaining 20 percent were provided by the Library of Congress, the National Library of Medicine, the National Agricultural Library, the National Library of Canada, the U.S. Government Printing Office, and, recently, the British Library. Benefitting from the size and currency of the database, OCLC users can locate cataloging records from OCLC for 94 percent of the items they catalog and thus need to perform original cataloging for only 6 percent of their materials. This is a considerable savings in time and expense in cataloging by member libraries.[5]

Adding to OCLC's success is its online interlibrary loan system introduced in 1979. The system is built on the shared database which includes 298 million member-location symbols. OCLC reports that in 1987/88 more than 3.78 million interlibrary loans were transacted online in one year and more than 20 million interlibrary loan requests have been logged since 1979. At present, better than 90 percent of the requests can be verified online and 87 percent are filled. Facilitated by electronic library-to-library communication through the OCLC telecommunications system, interlibrary loan items are shipped by mail or UPS to borrowers within an average of four days.

Although in recent years OCLC's services have extended to many other areas including serials control, acquisitions and a decentralized, minicomputer-based local system--LS/2000, Ohio University has chosen to participate only in OCLC's online union catalog, shared cataloging, and interlibrary loan components. These, in our judgement, represent the services best offered centrally to facilitate resource sharing and take advantage of economies of scale. Other OCLC services are either less competitive or were offered too late.

While OCLC was concentrating on improving services at the national level in the late 1970s and early 1980s, many libraries were looking for local systems for local library functions. The trend in the late 1970s was to develop or purchase a local system for circulation, online public access catalog, etc., which could interface (often through tape loading) with the OCLC online union catalog and shared cataloging service. Such a system enables a library to participate in OCLC for shared cataloging and interlibrary loans while downloading the OCLC-created MARC catalog records into local computer storage to support activities in such areas as circulation, acquisitions, fund accounting, serials check-in, and online public access catalog.

The availability of the online public access catalog to replace the century-old card catalog and the COM (Computer-Output-Microform) catalog of the 1960s and 1970s is widespread in the 1980s. The OCLC online union catalog is, and will continue to be, the single most important cataloging and interlibrary loan tool, but its lack of subject access and cryptic search keys have made it unattractive as an online public access catalog, although this may be overcome with the refinements scheduled to be available late in 1989 or 1990. The declining cost and expanding power of minicomputers and microcomputers as well as the availability of software packages for library functions have lured many libraries to seek local alternatives either individually or in clusters.

4. THE DEVELOPMENT OF THE LOCAL ALICE SYSTEM IN THE 1980s[6]

In 1978, Ohio University opted to explore locally integrated library systems capable of interfacing with OCLC but operated independently on a dedicated minicomputer. The result has been the successful implementation of the ALICE system which became operational in July 1983.

In September 1978, a task force to explore local library systems was formed to investigate possibilities and approaches. Consisting of library and computer center staff, faculty, and students, the task force sought an integrated system which would use OCLC for shared cataloging and interlibrary loans but would support, in modular form, circulation, and online public access catalog, acquisitions, and other library functions. The system should be based on a central database created from the OCLC MARC records with added holdings and location information as well as the barcode number. The task force considered circulation and an online catalog among the first priorities. Throughout 1980 and 1981, the task force studied nearly all available systems. On-site visits and presentations by vendors to the staff were arranged. In December 1981 the Virginia Tech Library System (VTLS), designed and developed by Virginia Polytechnic Institute and State University in Blacksburg, Virginia, was selected for the following reasons:

1. Provision of an integrated library system with an online linkage to OCLC's cataloging and utilization of MARC records to create the local database.

2. Immediate availability of an automated circulation system and online public access catalog, with planned expansion to include serials control, acquisitions, and management information--all of which complement the OCLC cataloging and interlibrary loan subsystems.

3. Ease of use of the system by both staff and patrons. Searches can be by author, title, subject, call number, and, now, key words with Boolean operators.

4. Reasonable cost of the software package and the annual maintenance fee compared with other available systems. (When Ohio University contracted for the software in 1982, the cost was $20,000 plus an annual maintenance fee of $3,000. The annual maintenance entitles the library to all enhancements released during the year.)

5. The quality and vision of the personnel on the VTLS team (including a common experience in an academic environment).

6. The degree of local control and flexibility allowed by the system, including local networking and short-form cataloging.

Recognizing that an automated library system requires a database of machine-readable cataloging records, the library, in 1979, began a massive effort to convert pre-1971 cataloging records to machine-readable MARC format with grants and gifts totalling $400,000. As the first library to participate in OCLC, the Ohio University was fortunate to own a large machine-readable database for materials cataloged online since 1971. As a result of the conversion effort, when the VTLS System was installed in August 1982, nearly 400,000 catalog records--representing nearly one million volumes--were loaded from archival tapes. These comprised about 80 percent of the Library's monographs, excluding titles in governmental documents and a large portion of the microform, maps, and non-print collections which were indexed or cataloged manually.

Typical of designated depositories for U.S. government documents, the library maintains a separate collection arranged by the Superintendent of Documents--SUDOCS) classification number (based on issuing body rather than subject content) that relies on the printed Monthly Catalog of the United States Government Publications (and annual accumulations) augmented by Congressional Information Service indexes for access. At the same time that Ohio University was celebrating its centennial as a designated depository in 1986, we purchased the cataloging retrospective records on MARC tapes from the Government and have loaded these into the local database as an integral part of the online public access catalog. Similarly, MARC tapes available through OCLC are being acquired for major microform sets as a result of the ARL[Association of Research Libraries]-initiated Major Microforms Project.

With the signing of a contract with VTLS and the ordering and installation of a Hewlett Packard minicomputer (HP 3000/40) hardware and other peripheral equipment in the early part of 1982, a search for a name for the local system resulted in selecting ALICE, with a credit to Lewis Carroll's Alice in Wonderland and suggesting the wonderland which the system would open for library users. Clinching the argument, was the song, "White Rabbit", in which the Jefferson Airplane advised, "Go ask Alice, I think she'll know"--exactly the attitude we hoped to cultivate toward the new system.

[Diagram III].

With the strong support of the University's Computing and Learning Services, where the Library's HP 3000 system is housed, installation and tape loading went well. The barcoding of a large portion of the library collection was time consuming, involving a majority of the library staff in 1982 and 1983. The completion of the tape loading in July 1983 enabled the library to formally inaugurate the online public access catalog and close its card catalog on July 15, 1983. Because creation of a patron file required additional preparation, the circulation function was implemented in September that year. By linking the library computer to the university-wide computer network from the beginning, the online catalog is accessible not only by library terminals located on every floor and in every service area of the main library building and the detached Music and Dance Library in the Music Building but also by terminals connected to the University network throughout the Athens campus. Dial access by microcomputers or terminals equipped with modems is also available regardless of location or distance [Diagram IV]. This is a feature only an online system can provide. Almost immediately, the libraries on the five regional campuses took advantage of this capability.

Because VTLS included networking in its design, the Regional Campuses located between 50 to 125 miles from Athens, have been able to network with the main library in the full use of VTLS for their library automation in a shared environment. The Lancaster campus was the first to become a secondary account of VTLS, and by 1985, had every feature that is available in Athens. By sharing the central computer but maintaining a separate database, O.U.-Lancaster has its own database and holdings for its users yet, by a simple command, they can switch to our much larger database and holdings. Conversely, users in Athens can also view the Lancaster database. At the present time, we are replicating this on other campuses, some by dedicated telephone lines and others by microwave telecommunications. [Diagram V]

Of course, every expansion of the local system requires the upgrading of the computer and peripheral equipment. Since the installation of a HP 3000/40 in 1982, we have upgraded to an HP 3000/64 in 1983, HP 3000/68 in 1984, HP 3000/70 in 1987, and, most recently, to an HP 3000/950 in 1989. The expansion of the CPU was accompanied by adding more and more storage capacities (from three 404 megabyte (MB) disc drives [totalling 1,212 MB] in 1982 to seven 404 MB and two 570 MB drives [totalling 3,968 MB] in 1987). The total value of the central hardware in 1989 approaches $500,000.

As the only major library in Southeastern Ohio, the Ohio University Library serves as the back-up resource library for public libraries in ten surrounding counties grouped under the Ohio Valley Area Libraries (OVAL). Through State Library funding, Ohio University Library provides reference and interlibrary loan ser-

vices to OVAL libraries, amounting in 1988 to 1,912 reference responses and 6,007 loans of books or photocopies. Future interconnection of OVAL Libraries with Ohio University Libraries is feasible, based on a consultant study,[7] but depends on the wishes of the member public libraries.

5. THE GROWTH OF ONLINE DATABASE SEARCHING

Paralleling the development of library automation since the 1960s has been the development of computerized databases by indexing and abstracting firms. Ohio University Library began online database search services in its Health Sciences Library in 1978. This was followed by a library-wide Computerized Information Retrieval Service (CIRS) inaugurated in 1979. Currently, we have online access to more than 400 databases in a variety of subject areas. In addition to those available through DIALOG, BRS, and STN, we have direct access to MEDLARS, Wilsonline, LEXIS/NEXIS, OhioPi (Ohio Public Information), and others. One-half of the cost for CIRS has been subsidized by the library to lessen the financial burden for students.

Our original hardware, a Texas Instruments terminal with no memory, an acoustic coupling, and 300 baud transmission speed, has been replaced by microcomputers. In 1983, the Library acquired an IBM-PC, equipped with a 1200 baud modem and Smartcom II as the communication software. This system permitted downloading of data and printing at a faster speed, and increased the cost effectiveness of searching, thus lowering patron costs. Additional hardware purchases, from 1984 to the present, have upgraded our systems to 80286-chip based IBM and Zenith machines, a Macintosh, and an IBM-XT--all with hard disks and 2400 baud modems. Further, to provide faster and better reference service, guidelines were established for the use of CIRS for ready reference service at the discretion of the reference staff, free of charge.

6. NEW AND EMERGING INFORMATION TECHNOLOGIES

In coping with the ever growing new and emerging information technologies which have flooded the market place, Ohio University Library has taken a number of steps to prepare itself for the inevitable. The future prospects are exciting and challenging. Among the steps taken are:

a. Expanding non-print collections to include many new formats.

Beginning in the 1960s the Library expanded its Microform Collection as more scholarly and research materials became available on that format. In the 1970s and 1980s, the federal government has published and distributed more and more of its publications in microfiche. To save space, money, and material, the library also decided early in 1979 to subscribe to both a paper copy and a microform copy of a number of

selected journals and to discard the paper copy after the peak-use period. By 1986 the library collection in microformat exceeded that in print volumes (1,319,107 microforms vs 1,284,130 printed volumes). It is typical that in 1988 the library added 67,236 new microform units compared to 49,071 new printed volumes.

Microforms today are only one of many non-print formats: audio and video cassettes, audio and data Compact Discs, microcomputer floppy disks, optical discs, videodiscs, etc. To adequately service these newer formats, the Library has acquired a range of new equipment including digital image and optical character recognition (OCR) scanning equipment for conversion of print materials, image preservation, and desktop publishing.

b. Growing use of CD-ROM based information.

The coming of age for CD-ROM laser technology demands new knowledge, skills, and methods to handle the Read-Only-Memory compact disc. To develop these, the Library has acquired general CD-ROM workstations with required MS-DOS PCs and disc players. As of May 1989, 24 CD-ROM databases are offered (with more added regularly) including ERIC, Books-in-Print Plus and Ulrich's Guide to Periodicals, PsycLit, Dissertation Abstracts (from the 19th Century to the present), MLA International Bibliography, Public Affairs Information Service (PAIS), a variety of Wilson Indexes and the Academic American Encyclopedia by Grolier. Dedicated workstations provide access to Compact Medbase, InfoTrac, and NewsBank. Offering data rather than bibliographic information on CD-ROM are Consu/Stats I (U.S. government-produced consumer data), Econ/Stats I and StatPak(government statistical data), and Compact Disclosure on corporations. Thousands of public domain software and shareware programs can be downloaded by users from PC-SIG. By use of the CD-ROM based information, the library hopes to develop methods and procedures for the handling of such technology to the best advantage. It is anticipated that end-user searching on CD-ROM will ease the demand for online searching (CIRS) serving increasing numbers of users without the cost of online searching; however, teaching students and faculty to use the various search software and databases effectively has proven very demanding of staff time.

c. Use of a telefacsimile machine (fax) for document delivery, reference service, and communications.

Between June 1986 and June 1987 the Health Sciences Library of Ohio University was chosen by the State Library of Ohio to operate an experimental telefacsimile network for the transmission of biomedical information in a multitype library

environment. Seventeen Ohio libraries of various types participated in the experiment. The one-year project demonstrated the need, reliability, value, and speed of using telefacsimile for document delivery of health related and biomedical interlibrary loan requests. The FAX equipment installed at all 17 sites was the Pitney Bowes 8150 costing $2,300 each.

While the state-funded library project was underway, the Vice Provost responsible for regional campuses placed Fax equipment in the library of each regional campus. Although primarily for use in information transmission by the deans of these campuses and the Vice Provost, the libraries regularly use it for document delivery and reference queries.

After the successful experiment on the use of a FAX machine, the library has expanded its scope to cover all library areas. The FAX machine is heavily used for interlibrary loans, routine telecommunications (especially overseas), and even to share memos and materials with other offices on campus (alleviating the need for messenger deliveries). As an example, as this paper was being written, we were able to respond to a query about non-Roman scripts in libraries from the Institute of Southeast Asian Studies in Singapore.

FAX has proven an easy and efficient means of communicating at any distance, rivaling regular mail in cost and surpassing it in speed, while eliminating the ubiquitous office problem of telephone tag.

d. Providing general public computer terminals and microcomputers for students and faculty in the library.

Since 1982, in cooperation with the University's Computing and Learning Services (UCLS), the library has provided space for a computer lab--the first of many of its kind established on the Athens campus. As of May 1989, the Lab offers 25 MS-DOS microcomputers, 13 Macintosh, 9 Apple II-Es, and 33 terminals connected to the University's Wide Area Network. The terminals in these labs provide additional means to access the ALICE online catalog, as well as other mini-and mainframe computers on campus.

e. Providing microcomputers for library departments and staff.

To facilitate office automation, more than 50 microcomputers have been installed in library departments over the last seven years--about one PC for every 1.5 regular staff. Microcomputers have been in use since 1982, but initial emphasis was on sharing. Staff members have been encouraged (and given numerous professional development opportunities) to learn the use of microcomputer for data and word processing. One local

area network (LAN) is in occasional use and the Library has access to the University's wide area network (WAN). Many courses and workshops in the applications of microcomputer have been offered by UCLS and the Library. Several staff struggle to remain current with the technology and serve as resident experts for other staff. Applications include calculation of the Library's acquisitions formula using SuperCalc5, specialized departmental databases, a variety of special bibliographies, a remote bulletin Board (RBBS) for Health Sciences faculty, desk-top publishing in both Macintosh and MS-DOS environments, and E-Mail (using BITNET and MCI Mail--the latter also providing telex facilities).

7. NEW DEVELOPMENT AT THE STATE LEVEL.

The information explosion confronts academic and research libraries with new challenges and opportunities, including space (shelving print materials, storage cases for other media, and floor space for workstations and other equipment required by newer media), identification (much of the most useful information is under-represented in bibliographic databases), and access (users can discover a variety of materials beyond the resources of any single institution).

It was the space issue which prompted the State of Ohio to launch its first major new initiative since the founding of OCLC two decades earlier. Confronted with massive capital requests for new or enlarged library buildings on state-supported university campuses, the State Legislature of Ohio created a special committee to assess the space requirements of university libraries. That committee, from its inception, recognized that space was only one dimension of the problem. The Committee emphasized:

> . . . [T]he academic library of today has a threefold purpose, serving not only as a storehouse of information, but also as a gateway to information held elsewhere, and as a center for instruction about information.[8]

Following the committee's report[9] in 1987, the Board of Regents (the state-level policy agency for all state-supported post-secondary schools) established a number of task forces to begin planning for a statewide information access system, the Ohio Library Information System (OLIS).[10] That planning process is nearing fruition with a Request for Proposals (RFP) scheduled for June 15, 1989. A decision on vendor(s) is expected by December 1989, and the system is scheduled to be acquired with funding available July 1, 1990, and to become operational on July 1, 1991.

The planning process has emphasized that this will be an information system for the 1990s. It is expected to join together, without replicating or replacing, local systems on the participating campuses. It will facilitate resource sharing among 15 state-

supported universities and medical colleges and two private universities, including permitting users to initiate interlibrary borrowing requests without an intermediary. On a single terminal, the user will easily move from a local online public access catalog to a statewide union catalog. To make resource sharing a reality, a statewide document delivery system will bring the documents to the requester's institution in three days.

Most significant is the emphasis on information. In addition to the usual bibliographic information found in an online public access catalog (OPAC), the system will offer a variety of indexing services to transparently provide the same access to journal articles and reports as to book and periodical titles, full-text services, data, and images. The system will also provide gateways to other information services which are not available within the system. Access is expected to be through microcomputers or, preferably, scholars workstations rather than terminals. With the anticipated innovations in the system, a phased approach is planned with attention to keeping the system open to further advances in the technology.

It would be premature to evaluate a system still in planning, but librarians, computer and telecommunications specialists, and faculty and researchers are working together to provide innovative service which may rival the earlier contributions of OCLC.

8. SUMMARY AND CONCLUSION

In reviewing library automation at Ohio University during the last three decades with particular regard to the use of computers, the picture matches nearly exactly that described by Richard DeGennaro in 1983:

> "We are well into our third decade of library automation. The first decade, the 1960s, was dominated by primitive local systems. The second decade, the 1970s, was dominated by large multitype and multipurpose library networks. The current and third decade, the 1980s, will be sophisticated multifunction turnkey systems on mini-and micro-computers; and they will have lines to a variety of library and commercial networks on large mainframe."[11]

The general trend of moving from centralization in the 1970s to the decentralization in the 1980s, according to his reasoning, has been "shaped and driven by the cost and capabilities of the computer and telecommunications technologies..." of that time period.[12]

Such has been our experience. Ohio University will seek to refine its local ALICE system and to fully implement all functions

making it a completely integrated system. The exploration of the potentials and impacts of CD-ROM and other new information technologies will continue. As the cost for computers further decreases and their capacity expands, appropriate employment of new information technologies for library services is necessary to harness the changing information environment and demands in the years ahead.

If one were to add a fourth decade to De Gennaro's report, we will be serving users with greater computing power sitting on their desks than was available through the mainframes of the 1970s. We are preparing for a time, described by Jacques Vallee:

> "Think about it, man," said a young enthusiast at the San Francisco home computer fair last year [1981], "you could have the entire Library of Congress at your fingertips.
>
> "What would you do if you had the entire Library of Congress at your fingertips? I asked him.
>
> I am still waiting for an answer.[13]

Not only should we **be able** to answer the question in the next few years, we **must** answer it.

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11. Richard De Gennaro, "Library Automation and Networking Perspectives on Three Decades." Library Journal, Vol. 108, No. 7 (April 1, 1983), p. 629.

12. Ibid.

13. Jacques Vallee, The Network Revolution: Confessions of a Computer Scientist (Berkeley: And/Or Press, 1982), p. 172.

Diagram I

MUSHROOMING OF OCLC

1988

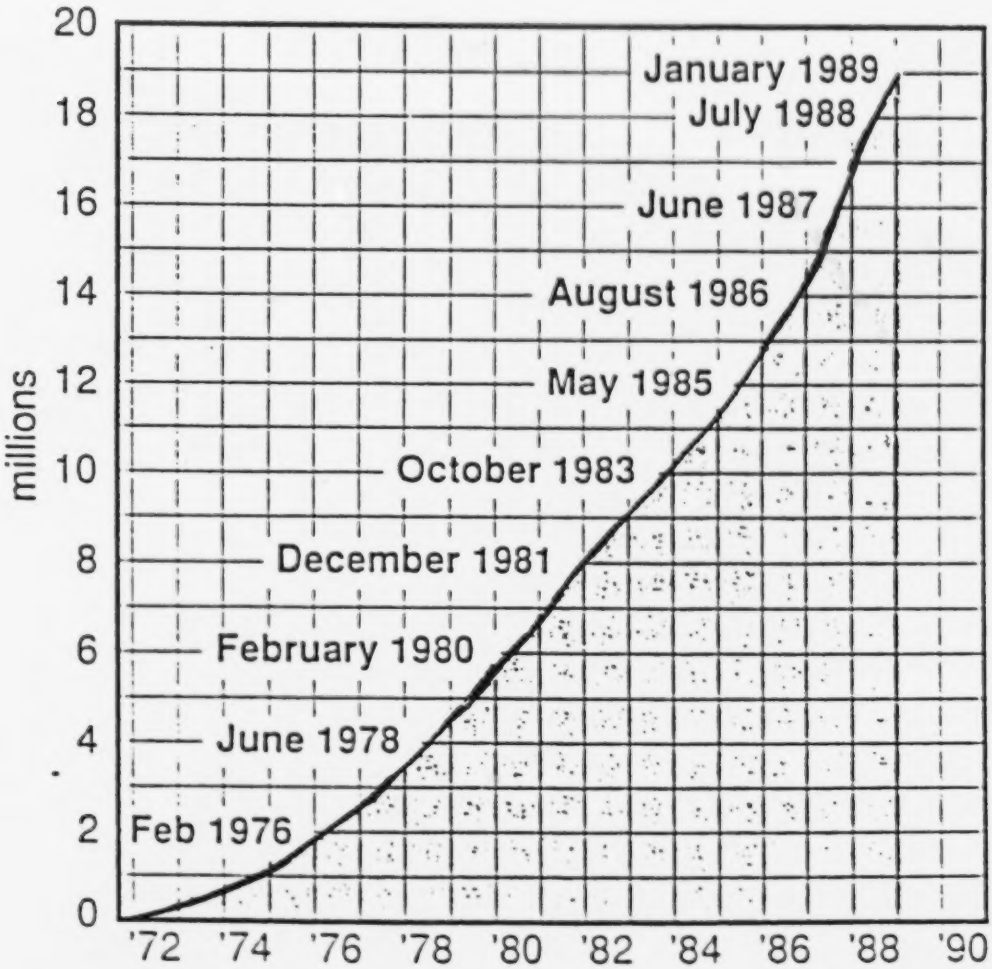
885	Staff Members
$95.7	Million Budget
9,400	Participating Libraries in U.S. and 26 Other Countries

1967

2	Staff Members
$67	Thousand Budget
54	Participating Libraries in Ohio

Diagram II

GROWTH OF OCLC DATABASE



80% of the records are contributed by OCLC members and 20% by the Library of Congress, National Library of Medicine, Government Printing Office, National Library of Canada, and the British Library.

Diagram III

The Development of Local ALICE System in the 1980's

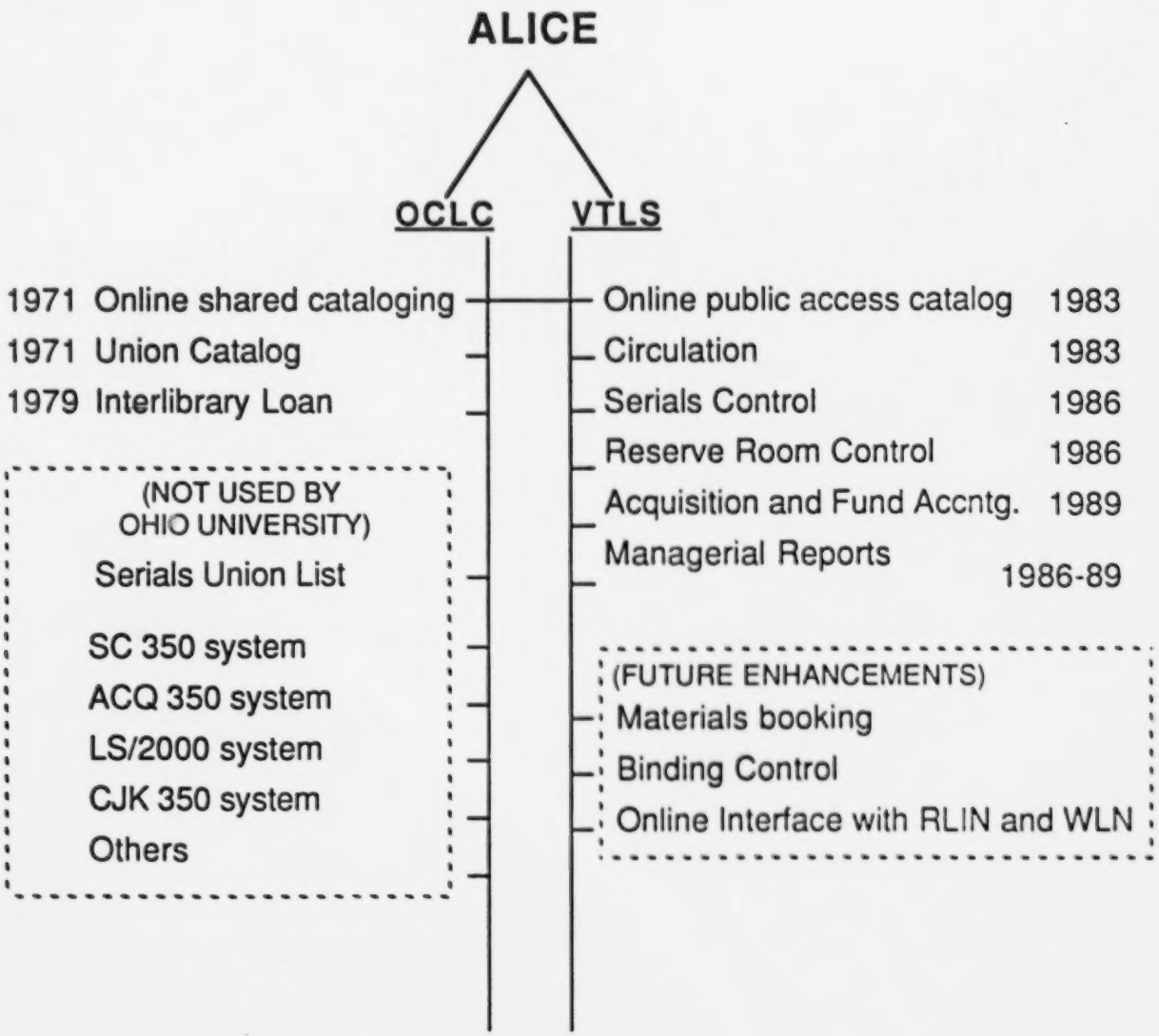


Diagram IV

ALICE within the Ohio University Computing and Communications Network

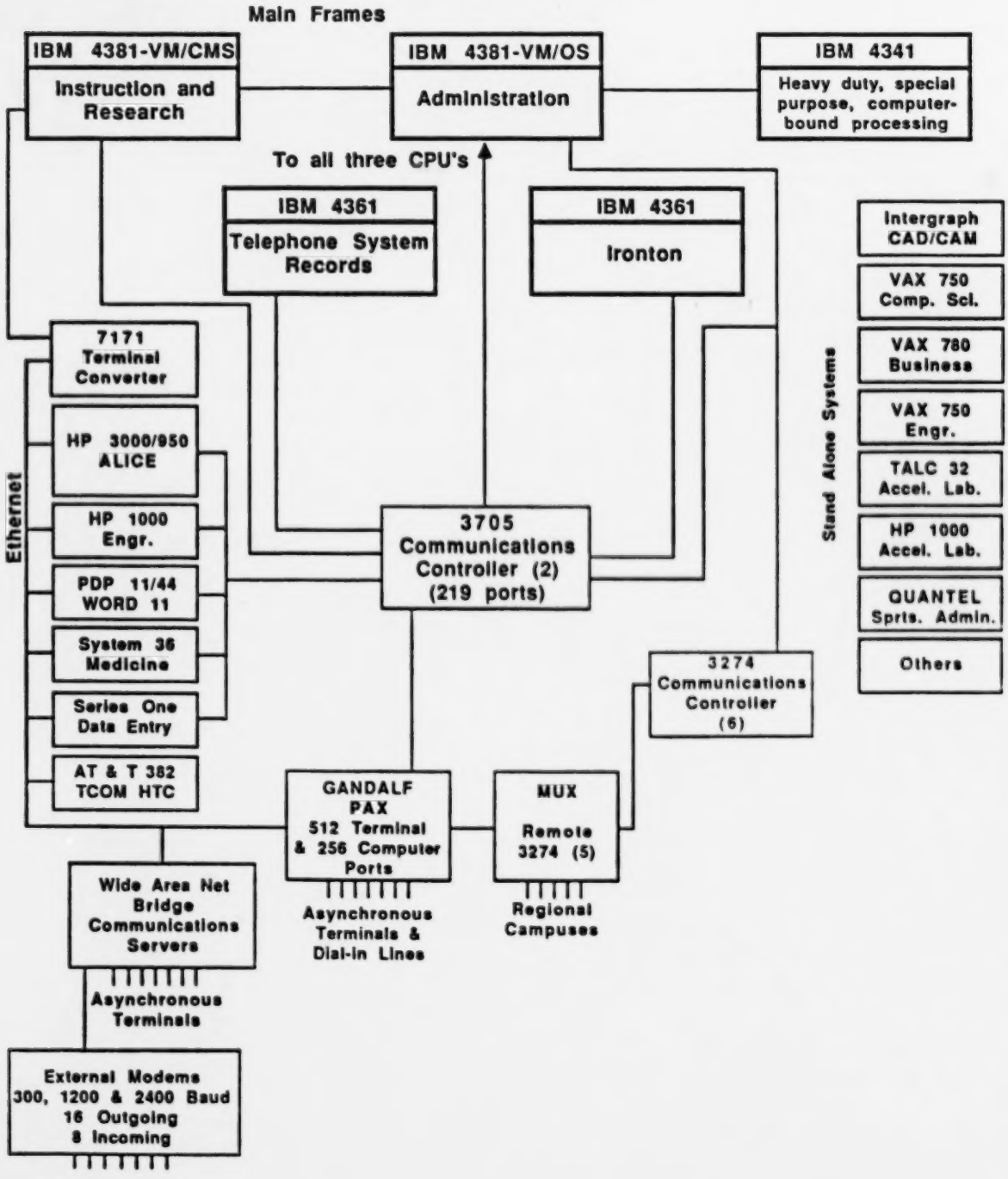
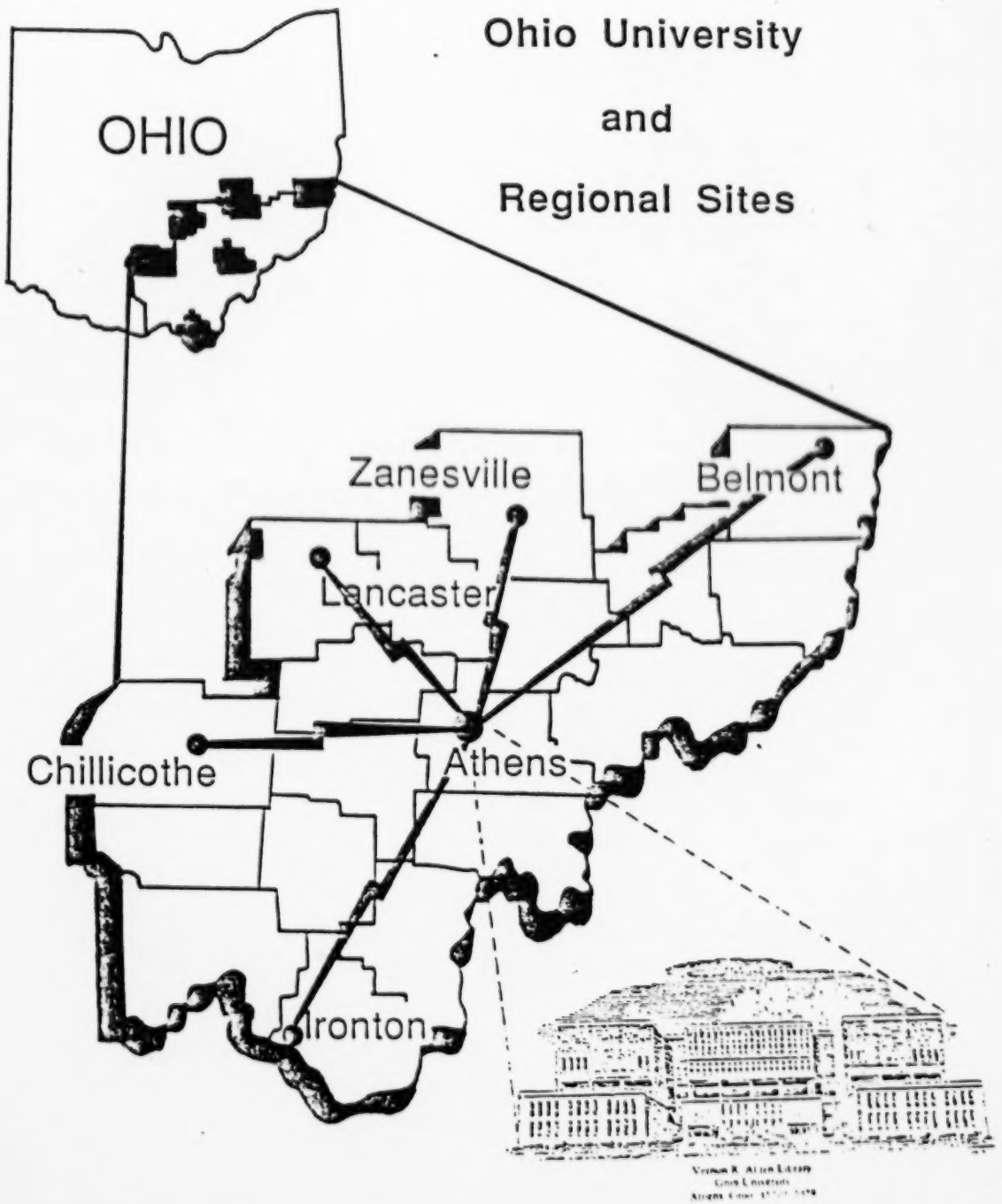


Diagram V


Ohio University
and
Regional Sites
OHIO
Zanesville
Belmont
Lancaster
Chillicothe
Athens
Ironton